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CURRENT LITERATURE.

BOOK REVIEWS.

Experimental morphology.

THE second part of Davenport's *Experimental Morphology*, which has been awaited with so much interest, has recently appeared.[1] This part deals with the effect of chemical and physical agents upon growth. It will be remembered that there are to be two parts more, devoted to cell division and development.

The general plan of treatment is the same in this part as in Part I, already reviewed in this journal.[2] Since the phenomena of growth have been more studied in plants, in which they are very prominent and yield themselves much more readily to analysis than in animals, the present part includes a more extensive discussion of plants than the first. This part, therefore, will have, if possible, a greater interest for botanists than the first, though the whole work will be of the greatest service to them.

A chapter is devoted to the effect of each agent which exercises an influence upon the rate or the direction of growth. From the chapter on chemical agents, water is excluded, being given a chapter by itself. Molar agents, gravity, electricity, light, and heat, are discussed in turn, and the part concludes with a chapter on the effect of complex agents on growth, and the general conclusions. Each chapter is followed by a bibliography of the more important papers on the subject treated, a feature of very great value to students.

Because of the wideness of the field traversed, it is impossible that such a work as this should be in the main anything but a compilation of the results of the labors of others, and we are glad enough that some one has had the courage to undertake so vast a task. It would be, therefore, somewhat ungracious to expect, much more to demand, the critical use of the great mass of literature. But most readers will expect a thoroughly digested presentation, and the book may be open to criticism in this direction.

A single illustration of this will suffice to indicate the form such criticism might take. In the discussion of traumatropism of roots, the author cites experiments of Pfeffer which, he says, show that "the identical plasm which is irritated responds, producing the traumatic curvature" (p. 386). But in discussing geotropic curvatures, he cites other experiments of Pfeffer, from which he concludes that "the curving part of the root can contain none of the originally irritated cells" (p. 396). These views can hardly be reconciled. It seems to be the first induction which is faulty.

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[1] DAVENPORT, C. B.— Experimental morphology. Part II. Effect of chemical and physical agents on growth. 8vo. pp. xa–xb, xv–xviii + 281–509. *figs. 75–140.* New York: The Macmillan Company. 1899. $2.00.

[2] BOT. GAZ. **23**: 467. 1897.

The most notable omission is the absence of any discussion of the theories of growth. This could hardly be other than intentional, but surely every reader will expect at least a presentation of the current ideas as to the mechanics of growth.

Some details may now be adverted to in order that readers may be guarded against indiscriminate acceptance of the author's statements and definitions.

It is doubtful whether clearness of ideas is attained by speaking of the cell sap as "living matter." One might with as much justice include the water secreted outside the cell as that secreted within the protoplasm.

Nor can there be any justification for the association of the phenomena of turgor, as in the motor organs of leaves, with those of true growth, under the phrase "transitory growth." Greater clarity of conception and expression is secured by limiting the term growth to the permanent or irreversible changes of form and volume. The dissociation from growth of certain changes (in the interior of spores, etc.) which do not result in increase of volume (the author's sole criterion of growth) is difficult and of doubtful value. In fact, it is impracticable to establish a single criterion for growth.

The account of the causes of twining is quite inadequate, as the author does not seem to be aware of the more recent experiments on the subject, none since Darwin's in 1882 being cited. The conclusion generally accepted today is certainly *not* that "twining is mechanical — depending upon the structure of the stem — rather than responsive" (p. 377).

The general discussion of the mechanics of tropic reactions is certainly very unsatisfactory. This is partly due, of course, to the present want of knowledge, a fact which might well have received more stress than the author gives it. The assumptions that are made are too many and too bold to be of any assistance in clearing up this very difficult subject. For example: the relations of growth and turgor are too uncertain at present to permit the mechanics of phototropism to be explained through the intervention of turgor. It must first be demonstrated that turgor controls growth, and not growth turgor. Again, the separation of the slow reactions from the more rapid ones, and the assumption that the former are due to "differential imbibition" and the latter to "assimilation," while the ones of intermediate rate "are probably due to the combined action of assimilation and imbibition," is not only gratuitous, but absolutely misleading (p. 481). And surely the author does not mean what he says when he suggests that "the tropic agent causes such a change in the molecules of the curving region as to cause them to imbibe water with abnormal activity" (p. 482).

In spite of such minor defects, which are of importance only to the student whose knowledge is not general enough to guard against them, this part, like its predecessor, must take a high rank among the books destined to advance the knowledge of living organisms. This it will do, not only by making more available an immense mass of important data, and pointing out the source of others, but still more effectively by its suggestiveness as to profitable direction for experimentation.—C. R. B.

The principles of agriculture.

THE authors of books written in illustration and aid of agriculture may be roughly grouped into three classes. First, those who, unacquainted with science, are adepts in practice and have faithfully described their own methods, together with the usages of others who have successfully followed some branch of the business of farming; second, those who have written from the standpoint of pure science; and third, those who combine a practical knowledge of agriculture[3] with a thorough knowledge of the sciences with which the art is intimately related and upon which the best practice chiefly depends.

Professor Bailey belongs to the latter class and his qualifications for writing or editing a text-book treating of the "principles of agriculture" are by no means slender.

Will the book edited and largely written by him, meet the needs of those for whom it is designed? Let us consider.

The general arrangement or plan of the book is excellent. It begins with an appropriate introduction, which defines agriculture and its main subdivisions, discusses the personal factors upon which success depends, and shows the relation of the natural sciences to this great industrial art.

The main body of the book is divided into three parts, viz.: The soil; the plant, and crops; the animal and stock. The six chapters into which part one is divided are written by four different men. Part two has three different authors, and part three has four.

Those who have assisted Professor Bailey in the preparation of this work are his colleagues or associates in Cornell University as follows: I. P. Roberts, James Law, H. H. Wing, John W. Spencer, L. A. Clinton, G. W. Cavanaugh, and B. M. Duggar.

In addition to its logical arrangement the book has the merit of being written in language that few can can fail to understand. The use of terms unfamiliar to the general ear has been avoided, and there are few paragraphs which will not be readily and fully understood by the average school boy of fifteen or sixteen years.

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[3] BAILEY, L. H., *et al.*: The principles of agriculture. A text-book for schools and rural societies. 12mo. pp. 300. Illustrated. New York: The Macmillan Company. 1899. $1.25.